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HULL AND CARGO SURVEYORS, INC.
INLAND MARINE - INSPECTIONS - LOSS PREVENTION - SHIP & AIR CARGO
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April 6, 1983

SFH 82027
Paddle Tug "EPPLETON HALL"
National Park Service
Golden Gate National Recreation Area

Preliminary inspections were made with Mr. Steve Hastings, G.G.N.R.A. prior to setting specifications for drydocking above vessel. When vessel was taken to Pacific Drydock & Repair Company, Oakland, California, further inspection and survey was undertaken to determine condition of hull and machinery. Both visual inspection and ultrasonic gauging was completed on boilers and on shell plate.

General Condition

Visual condition overall is presently fair to poor. Bulwarks are wasted through in many areas leaving a "lace-like" appearance. Virtually entire replacement of steel bulwark plate leaving only frames and riveted butts for appearance is necessary.

Deck, where steel is exposed is heavily waved and pitted. While major replacement is not necessary at present, any further deterioration will certainly cause penetration.

Wood sections, including deck, pilot house etc are presently in fair to good condition. However, as with any wood structure in the marine environment, constant maintenance is necessary to keep protective coatings in good order.

Hull condition varies drastically throughout. At least 4 complete plates in transom area are entirely wasted through. These are presently covered with doubler plate but for a structural repair would have to be replaced entirely.

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Rudder stock penetration through hull is wasted away. A temporary repair of split pipe inserted with epoxy retains minimal water tight integrity but again, complete replacement is necessary.

See attached diagram of hull for specific gauge readings of plate thickness. The anomalous thin spots indicated in virtually random fashion indicate probable severe internal wastage concealed by interior paneling. The only way to further check the internal condition is to remove at least portions of the paneling for further inspection. Similarly, severe wastage in transom area indicates probable trouble with internal structure. This can only be determined after removal of shell plate for replacement.

Machinery

Boilers, in present condition, have been condemned for use by U.S.C.G., ABS and Hartford Steam Boiler inspectors. Specifically, stay bolts are noted wasted more than 30%, fire box (center flue) wasted and holed on both boilers at aft end at return and shell plate wasted to a thickness of less than $\frac{1}{4}$ " in way of handholes on port boiler. In addition, moderate deformation (bulges) noted in fire boxes of both boilers.

Ocean Shores Boiler Works has examined plans and noted visual damage. They state that while no firm figure can be stated until one of their engineers is hired to make a complete estimate, a rough guess from visible problems could run from \$100,000.00 to \$150,000.00 per boiler to bring them back to a completely safe and sound condition. Paranthetically, this type of boiler is by far more hazardous than the more modern water tube boiler. If the fire box should collapse, even with only 30-35 PSI of steam the entire mass of water in the boiler would instantly try to turn into steam. This would produce a 3 foot diameter steam jet into fire room - engine room area cooking anyone in the vicinity. Also there is a good possibility of the entire boiler taking off like a missile out through the aft end of the vessel.

In short, it is strongly recommended that no attempt be made to fire boiler until repairs are made.

Remaining machinery is in generally poor condition. Not only were engines allowed to sit with salt water in the cylinders but most auxiliaries are in need of repair. The following list is of most obvious needed items.

- 1) Attached feed pump shaft badly scored.
- 2) Both attached bilge pumps inoperable.
- 3) Duplex fire - bilge pump in poor condition.
- 4) Anchor windlass almost inoperative.
- 5) Diesel powered oil service pumps inoperative.
- 6) Burner system in poor condition in addition to fact that insufficient heating surface is used in present single burner configuration.
- 7) Air pump questionable, valves bad.
- 8) Steering gear in very poor condition.
- 9) Spray condensor questionable.

Cost Estimates

While boiler estimate of \$100,000.00 to \$150,000.00 per boiler is very rough, it could be refined by paying a boilermaker to make an estimate. The remaining items depend to a large extent on condition as revealed by removals of interference. Interior paneling and exterior shell plate aft are items in point.

Transom area, visible problem: \$30,000.00
Internal renewal \$8.00/lb

Shell plate in suspect areas
renewal of selected plates
@ 10' x 5' x ½" each \$10,000.00 x number of plates

Machinery:

Noted Items	\$45,000.00
Bulwarks:	25,000.00

It is felt that a minimum estimate to restore vessel to "good" condition would be \$400,000.00. A more probable figure for four years in the future would be \$550,000.00.

Surveyors Notes:


It is felt that a minimum crew of 2 regular daily people should be able to keep up with maintenance on wood areas and general housekeeping. In order to do any machinery work, they would have to be assisted at least on a part time basis by a qualified marine engineer or machinist.

With regular staffing, most of machinery repairs and possibly above water replacements, i.e. bulwarks could be accomplished prior to next dock period. In addition, internal removals could be made to detail areas of needed hull repair.

If vessel is allowed to sit without regular care, it is certain that any estimate will be much greater at drydocking.

A further protection item which will help prevent further exterior deterioration is installation of an impressed current cathodic protection system. The temporary system of hanging zincs electrically bonded to steel hull will help prevent electrolytic action but the impressed current system would be vastly more effective even helping to prevent the oxidation reaction.

HULL & CARGO SURVEYORS, INC.


R. A. Wehnau

RAW/mab

Requested by: Mr. S. Hastings
G.G.N.R.A.